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Painted Rocks
Dam (also known as
West Fork of the
Bitterroot Dam)

PAINTED ROCKS DAM

**(Also Known As
West Fork of the Bitterroot Dam)**

MANUAL FOR OPERATION AND MAINTENANCE

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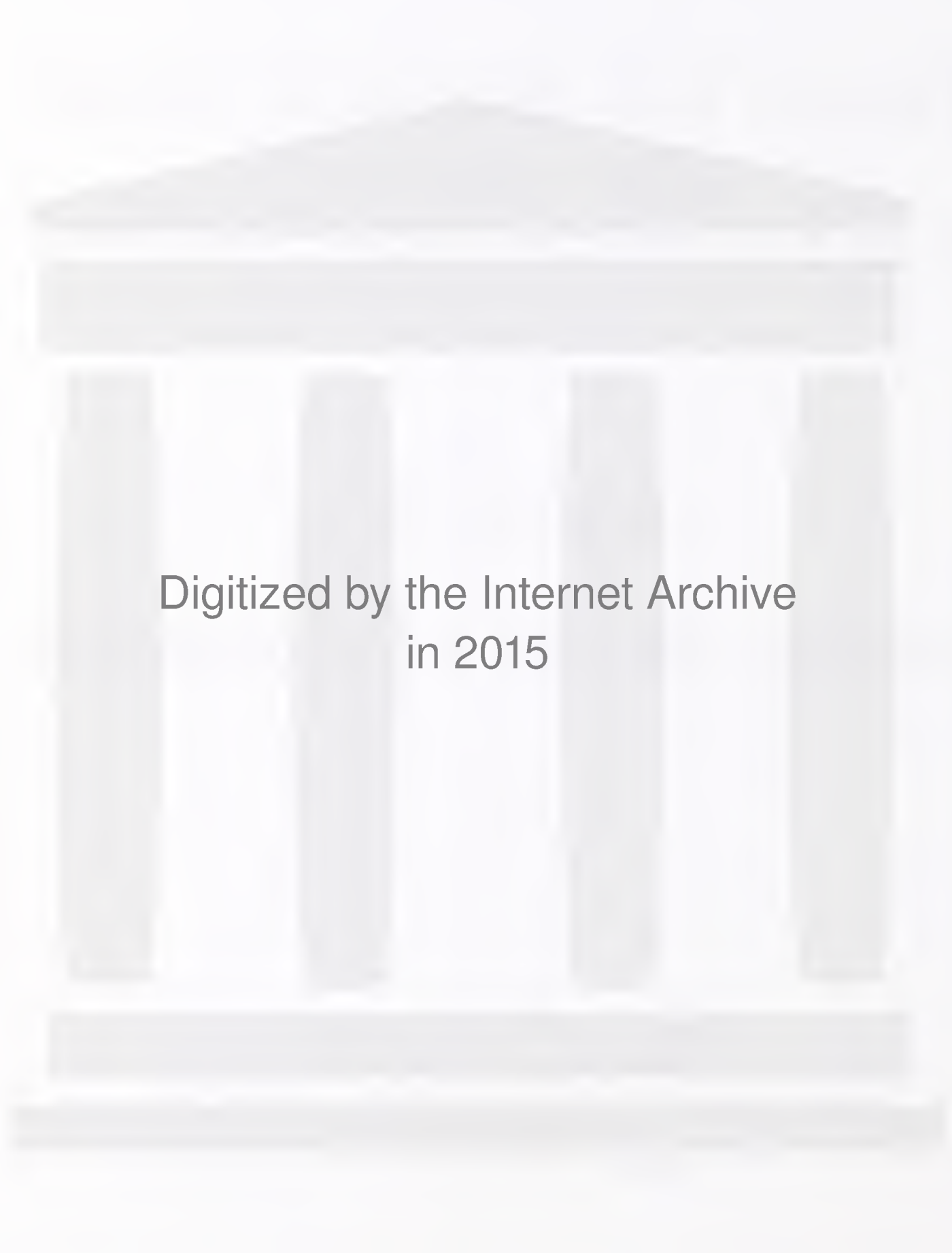
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Contents

OVERVIEW	1
General Location Map (Figure 1)	2
Project Area Map (Figure 2)	3
General Layout Map (Figure 3)	4
STATISTICAL INFORMATION	5
OPERATING PROCEDURES	9
Method and Schedule of Operation	9
Safe Drawdown	9
Limitations of Appurtenances	10
Dam Operator	10
Storage Determination	11
Weather Monitoring	12
Interaction with Other Dams	12
INSPECTION AND MONITORING	13
Structural Features Inspection	13
Riprap Inspection	14
Seepage Monitoring	14
MAINTENANCE	15
Routine Maintenance	15
Annual Maintenance	16
Record Keeping	17
REFERENCES	19

APPENDICES

A. RATING CURVES AND TABLES	A1
Table A1. SLOPE/ELEVATION/STORAGE TABLE	A2
Table A2. ELEVATION/STORAGE TABLE	A10
Table A3. SPILLWAY RATING CURVE AND TABLE	A13
Table A4. OUTFLOW RATING TABLE	A14
Table A5. BLUE JOINT CREEK RATING TABLE	A16
Table A6. OVER WHICH CREEK RATING TABLE	A17
Table A7. WEST FORK BITTERROOT RATING TABLE ...	A18
B. INSPECTION CHECKLIST	B1

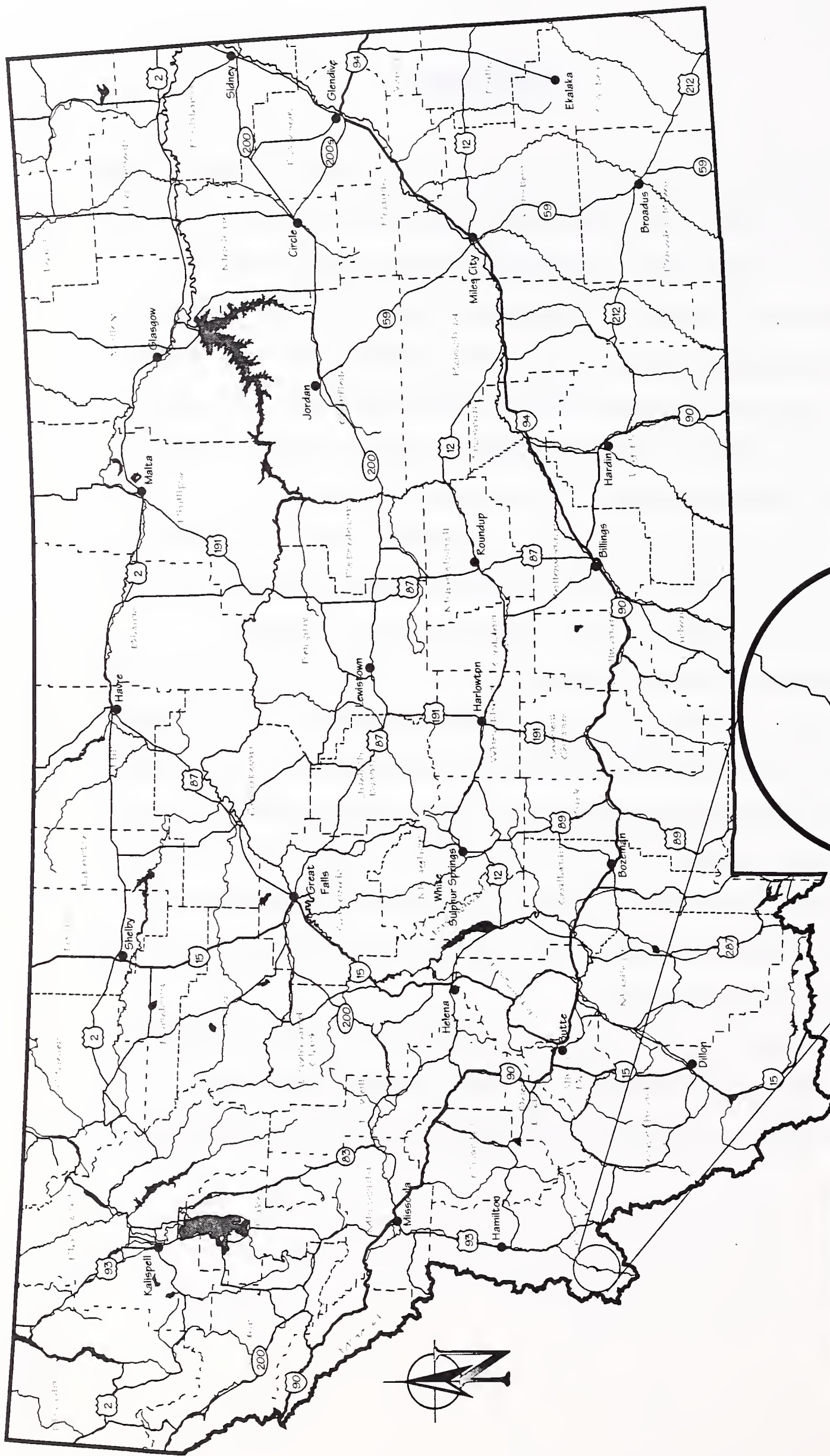
OVERVIEW

West Fork of the Bitterroot Dam, also known as Painted Rocks Dam, is located on the West Fork of the Bitterroot River in Ravalli County. The project is approximately thirty miles southwest (upstream) of the town of Darby (see Figures 1 and 2). Figure 3 provides a general layout of the dam, spillway and outlet works.

The dam is owned by the Montana Department of Natural Resources and Conservation (DNRC). The State Water Projects Bureau (SWPB) manages and operates the dam.

The earthfilled dam was completed in 1939. The dam is 143 feet high and 800 feet long. The dam's outlet works, located through the right abutment, consists of a 10 ft. diameter horseshoe shaped outlet and a wet tower with two 5 ft. X 8 ft. roller gates (one operating gate and one emergency gate) with controls located at the dam crest and a 42 inch diameter air vent. A cable hoist mechanism powered by an electric motor operates the gates. The dam's spillway, located in the right abutment, has a 160 foot wide crest tapering to a 60 foot wide chute and is 360 feet long. The uncontrolled spillway has a capacity of 42,000 cubic feet per second at the dam crest.

Water from the reservoir is primarily used for irrigation and fisheries water supply. The reservoir also is used for water-based recreation and the regulation of instream flow rates.



Painted
Rocks
Dam



Figure 1. General Location Map

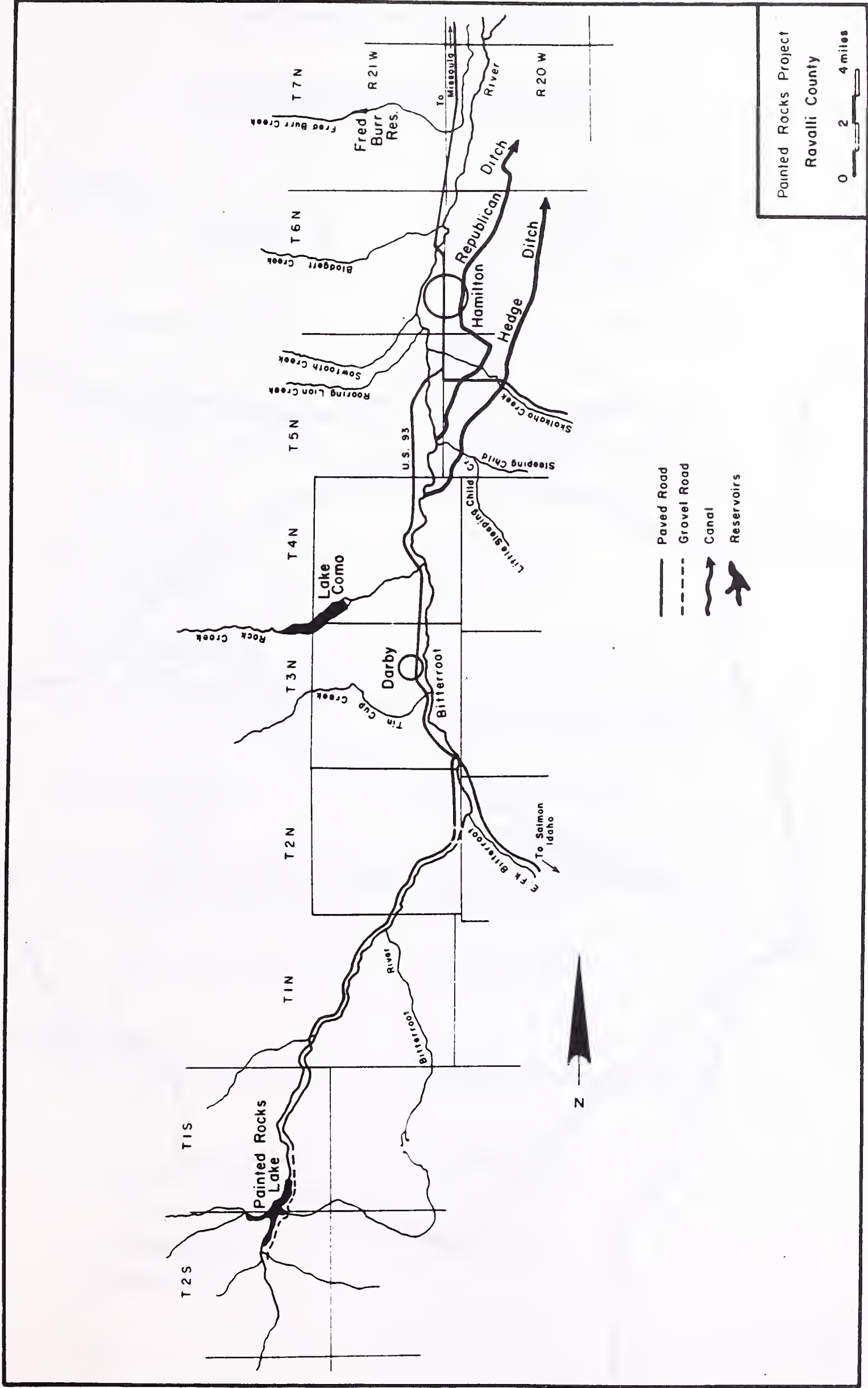
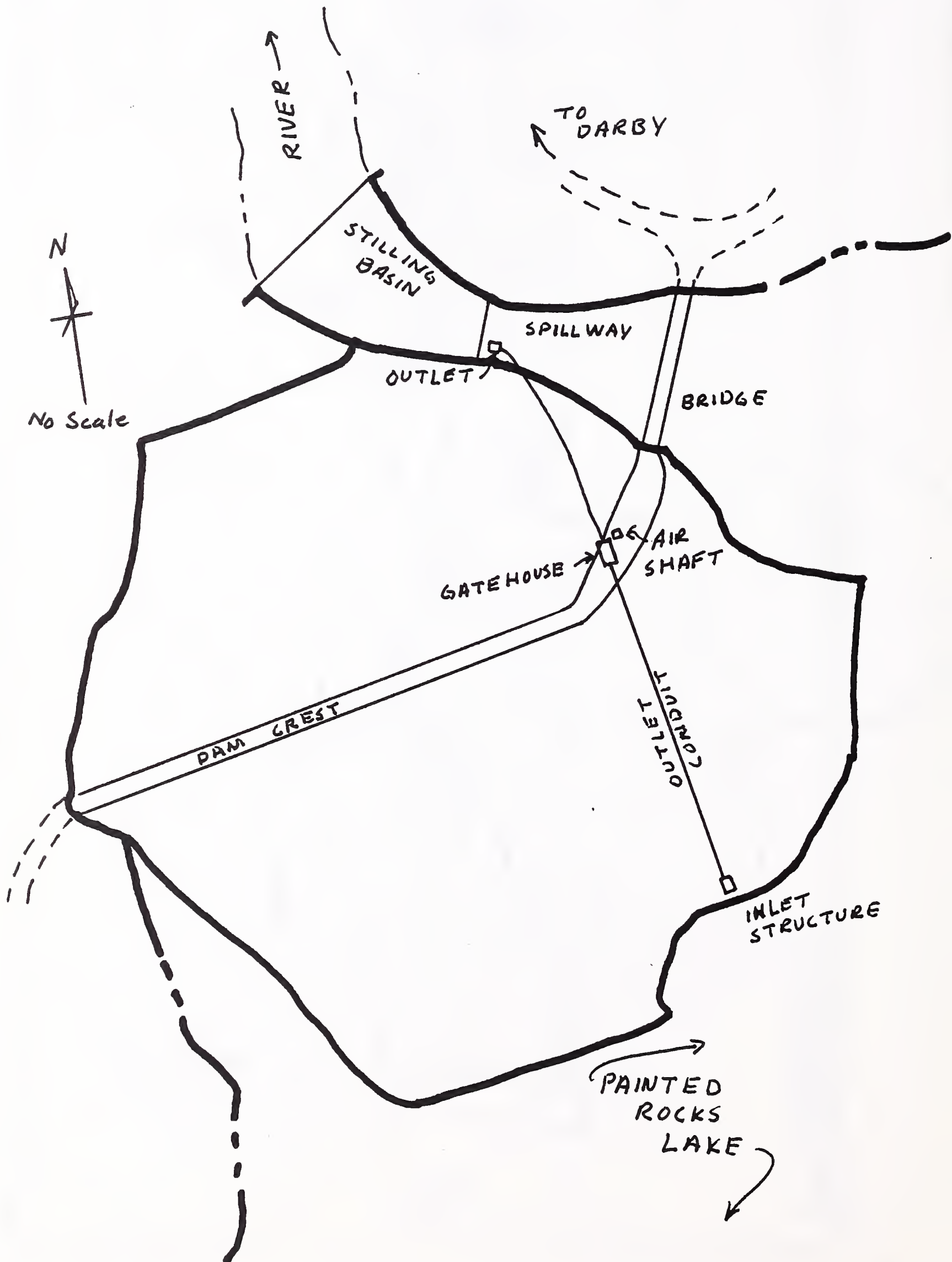


Figure 2. Project Area Map

Figure 3. General Layout Map



STATISTICAL INFORMATION

1. General

- | | |
|-----------------------|---|
| a) Owner | Montana Department of
Natural Resources and
Conservation (DNRC) |
| b) Operator | State Water Projects Bureau,
DNRC |
| c) Location | Sections 26, Township 1
South, Range 22 West,
Montana Principal Meridan,
30 miles southwest of Darby |
| d) Latitude | 45° 43' 06" |
| Longitude | 114° 16' 42" |
| e) County--State | Ravalli--Montana |
| f) Watershed Location | West Fork Bitterroot River,
Clark Fork River basin. |
| g) Drainage Area | 316 square miles |

2. Principal Elevations (feet above mean sea level)

- | | |
|----------------------|--------------|
| a) Maximum Dam Crest | 4743.07 feet |
| b) Normal Full Pool | 4725.5 feet |

3. Reservoir

- | | |
|-----------------------------------|-----------------------|
| a) Length of Maximum
Pool | 3 miles (approximate) |
| b) Maximum Reservoir
Level | 4743.07 feet |
| c) Surface Area at
Normal Pool | 655 acres |

4. Storage

- | | |
|---|------------------|
| a) Total Storage
(at dam crest
(elevation 4743.07 feet) | 45,100 acre-feet |
| b) Active Storage
(at spillway crest)
(elevation 4725.5 feet) | 31,706 acre-feet |
| c) Maximum Surcharge | 13,394 acre-feet |
| d) Dead Storage
(at invert of intake structure)
(elevation 4625.5 feet) | 656 acre-feet |

Note: Total storage and active storage does not include dead storage.

5. Hydrology

- | | |
|---|------------|
| a) Inflow Design Flood
(Probable Maximum Flood -- PMF) | 41,500 cfs |
| b) 100 Yr Flood | 4,100 cfs |
| 500 Yr Flood | 5,020 cfs |

6. Embankment (Dam)

- | | |
|---------------------|-------------------|
| a) Type | Earthfill |
| b) Hydraulic Height | 143 feet |
| c) Crest Length | 800 feet |
| d) Crest Width | 20.5 to 35.5 feet |

- | | |
|---------------------|---|
| e) Downstream Slope | 1v on 2h
(above elevation 4650.5 feet) |
| | 1v on 4h
(below elevation 4650.5 feet
and above elevation 4620.5
feet) |
| | 1v on 1.5h
(below elevation 4520.5 feet) |
| f) Upstream Slope | 1v on 2.5h
(above elevation 4650.5 feet) |
| | 1v on 4h
(below elevation 4650.5 feet) |

7. **Outlet Works**

- | | |
|---|---|
| a) Size | Horseshoe-shaped reinforced
concrete tunnel (10 ft
diameter) |
| b) Length | 580 feet |
| c) Gate | Two 5-foot by 8-foot roller
gates (one operating gate, one
emergency gate) located at the
bottom of a vertical tower |
| d) Control | Gates controlled by electric
motor pulley system from the
dam crest |
| e) Capacity | 3,300 cfs
(at pool elevation 4743.07 feet) |
| f) Design Invert Elevation | 4605.5 feet |
| i) Top tower grate
(lower floor elevation) | 4729.5 feet |
| ii) Top Intake Structure | 4635.5 feet |
| iii) Inlet Invert Elevation | 4625.5 feet |

- | | |
|---------------------------|--|
| g) Trashrack | Yes |
| h) Airvent | 42 inch diameter |
| 8. <u>Spillway</u> | |
| a) Location | Right abutment |
| b) Crest Elevation | 4725.5 feet |
| c) Type | Uncontrolled Concrete Chute
With Ogee Crest Control |
| d) Width | 160 feet at crest tapering to
60 feet |
| e) Capacity | 42,000 cfs
(at pool elevation 4743.07 feet) |

OPERATING PROCEDURES

Painted Rocks Dam is operated by the State Water Projects Bureau (SWPB). The primary operating goal of the reservoir is to provide an adequate supply of irrigation and fisheries water to meet contracts with water users without exceeding safe storage or flow levels.

METHOD AND SCHEDULE OF OPERATION

Depending on snowpack, runoff patterns, and carryover storage, filling the reservoir usually starts in April or May. The goal is to have the reservoir full before the main runoff has receded to a flow where all inflow must be allowed downstream to satisfy senior water rights.

The beginning date of irrigation releases varies from year to year, with late April typically the earliest month during which irrigation releases begin. The last irrigation releases typically are made by October 1. All dates tend to vary depending on a year's actual climatological and hydrological conditions. Water is also released from the dam to help regulate instream flows for fisheries. These releases are dependent upon the yearly flow conditions in the Bitterroot River.

SAFE DRAWDOWN

To ensure stability of the upstream embankments, it is recommended that reservoir drawdowns not exceed one foot per day. This recommended rate should not be exceeded without the approval of the SWPB.

LIMITATIONS OF APPURTENANCES

With the reservoir at the dam's crest, the maximum capacity of the spillway using a head-discharge relationship is 42,000 cfs. However, since the quickly converging spillway chute walls may initiate wave action, the spillway chute walls may be overtopped at lesser discharges. Based on a model study performed before construction, the spillway chute walls were designed to safely pass 30,000 cfs. The spillway chute walls could be overtopped at flows greater than 30,000 cfs.

The maximum capacity of the outlet conduit, with the reservoir at the dam's crest, is 3,300 cfs. Therefore, the combined maximum conveyance capacity of Painted Rocks Dam is about 45,000 cfs.

The maximum recommended winter storage is 14,947 acre-feet (elev. 4693.0 feet) which is to protect the riprap on the upstream face of the dam. The minimum reservoir capacity during the winter is 1,907 acre-feet (Elev. 4643.5 feet) which will protect the inlet structure from freeze-thaw damage.

DAM OPERATOR

The responsibility for the daily operation of the dam and reservoir rests with the SWPB and its dam operator. The dam operator is generally authorized to operate the reservoir to meet the SWPB's goals. The dam operator's specific responsibilities are to:

1. Operate the mechanical features of the outlet works
2. Coordinate filling of the reservoir and the release of water
3. Notify the SWPB of unusual occurrences such as impending floods, excessive seepage, etc.
4. Perform maintenance tasks.

A new dam operator typically is trained by the current dam operator and the SWPB. The dam operator's training focuses on the mechanical operation of the gates, storage level measurement, the rate of water release measurement, and record-keeping. The outlet gates are operated by an electric motor, and, if necessary, they can be operated manually with a hand crank. The outlet works are intended to be used for controlling the release of irrigation water and for providing minimal emergency relief.

The dam operator typically is available to observe the dam and perform operating functions weekly during the filling and irrigation seasons, and monthly at other times. Communication between the dam operator and the SWPB typically takes place by telephone. During emergencies or unusual occurrences, radio communication may be established so that the dam operator can speak directly with county authorities and communicate indirectly with the State Water Projects Bureau (see *Painted Rocks Dam Emergency Plan*).

STORAGE DETERMINATION

Reservoir storage is determined by taking slope measurements at the boat ramp located approximately 1/4 mile east of the dam. Measurements are taken on the upstream side of the concrete boat ramp. To determine the elevation of the reservoir surface and storage of the reservoir, measure in feet from the ring at the top of the boat ramp to the water surface. The elevation of the reservoir surface and the storage can then be found using the Slope Distance-Elevation-Storage table (Table A1) in Appendix A.

WEATHER MONITORING

Weather conditions will be monitored by the dam operator through normal, local weather forecasts and the National Weather Service (NWS).

INTERACTION WITH OTHER DAMS

There are no dams of any size above Painted Rocks reservoir. There are also no dams below Painted Rocks reservoir in the Bitterroot River drainage. However, there are a number of irrigation diversion dams in the river below the dam.

INSPECTION AND MONITORING

The SWPB conducts annual inspections of the dam. Appendix B includes an example of a SWPB inspection form. In addition to annual inspections, SWPB personnel will inspect the dam and reservoir during and after heavy runoff and severe rainstorms and windstorms, during high storage periods, and after an earthquake. The embankment is not monitored by instrumentation.

STRUCTURAL FEATURES INSPECTION

Structural features include the outlet works, gatehouse, spillway, and embankment. The SWPB inspects these structures annually as part of its inspection program. Items to be checked or noted include, but are not limited to, the following:

1. Outlet Works

- a) Any differential settlement or movement resulting in cracking of the conduit
- b) Erosion of the seals or concrete by cavitation immediately downstream of the gates
- c) Major seepage of water into the conduit
- d) Major deterioration of exposed concrete due to freeze/thaw cycles or sulfate reactions
- e) Operation of both gates through a full cycle
- f) Air vent for free, unobstructed operation
- g) All metal for corrosion
- h) Hoist machinery for proper lubrication
- i) Condition of hoist cables

2. Gate House

- a) Any damage or vandalism

3. Spillway

- a) Erosion of the spillway channel
- b) Blockage of the approach or exit channel
- c) Concrete condition
- d) Condition of the log boom
- e) Stilling basin

4. Embankment

- a) Erosion
- b) Settlement, bulges, sink holes, cracking, misalignment
- c) Rip rap displacement
- d) Damage from burrowing animals
- e) Excessive vegetation, brush, trees
- f) Seepage

RIPRAP INSPECTION

The riprap along the face of the dam should measure at least 30 (thirty) inches thick. Immediately after the occurrence of high water, the riprap should be inspected and additional riprap added if needed.

SEEPAGE MONITORING

There has been no observed seepage areas on or around the dam and abutments. There are weep pipes in the spillway which discharge small amounts of water when the reservoir elevation is near the full pool elevation.

MAINTENANCE

The SWPB is responsible for the project's routine maintenance. Normal maintenance activities will be identified and performed by the dam operator during regular visits. Items that need maintenance or repair also will be identified during the annual inspections conducted by the State Water Projects Bureau. Major repairs will be completed by a contractor and will be supervised by the State Water Projects Bureau.

ROUTINE MAINTENANCE

Any routine maintenance necessary to protect the dam or keep it in good working order will be performed by the dam operator as soon as a need is identified. The dam operator will watch for any potential maintenance requirements during normal visits to the dam. Items that may need occasional attention include, but are not limited to:

1. *Lubrication of gate-operating mechanisms.*
2. *Debris or silt plugging the inlet or the outlet channel.*
Accumulated debris that could affect the operation of these appurtenances should be removed at once.
3. *Erosion gullies on embankment.* Development of erosion gullies should be checked immediately. Gullies should be filled, compacted, and seeded. Particular attention should be paid to the groin/abutment contact areas and the downstream face where four-wheel drive tracks may become a problem.

4. *Rodent damage.* Rodent burrows should be filled immediately and the rodents eradicated.
5. *Upstream slope riprap.* Reservoir riprap will be maintained on as needed basis, and may need occasional repairs due to high water or wave action.
6. *Vegetative cover on downstream slopes.* Good vegetative cover must be maintained, but large brush and any trees should be removed.
7. *Noxious weeds.* Noxious weeds on and around the dam should be sprayed at least on an annual basis.
8. *Cleaning spillway wall tops.* Spillway wall tops should be clear of any dirt, rocks, grass, brush, and any overhanging vegetation or trees.

ANNUAL MAINTENANCE

The SWPB conducts annual inspections of Painted Rocks Dam and reservoir. During these inspections, any items that require maintenance are identified and recorded. The report identifies items that need maintenance and requires that the SWPB provide a schedule of when those maintenance tasks will be performed.

Items identified during the inspection that may need annual maintenance include outlet works, gates, hoist mechanism, spillway, riprap, roads, embankment and the gatehouse. Any other routine items that need immediate attention also will be noted during the annual inspection. The need to remove trees or brush, or spray weeds, will also be addressed in the report.

RECORD-KEEPING

The SWPB maintains records--including photographs--of all inspections and maintenance requirements. These records also include flow measurements and storage volume. Anyone who wants to review these records may do so in the SWPB's office at the DNRC in Helena.

REFERENCES

CH2M Hill, July 1980. Phase 1 Inspection Report, National Dam Safety Program, West Fork Bitterroot (Painted Rocks) Dams, Darby Montana, Ravalli County, MT-19. Prepared for the State of Montana (DNRC) under the U.S. Army Corps of Engineers National Dam Safety Program.

APPENDICES

APPENDIX A
RATING CURVES AND TABLES

TABLE A1. PAINTED ROCKS DAM SLOPE DISTANCE-ELEVATION-STORAGE TABLE

Dec. 1997

(Note: Measurements taken on the upstream side of the concrete boattramp.)

SLOPE DISTANCE FEET	ELEVATION FEET	STORAGE ACRE-FEET	NOTES	SLOPE DISTANCE FEET	ELEVATION FEET	STORAGE ACRE-FEET	NOTES
0	4730.21	34975	Top ring #1	44.35	4727.76	33274	Top ring #2
0	4729.91	34767	Base ring #1	44.35	4727.50	33094	Base ring #2
1	4729.88	34746		45	4727.44	33052	
2	4729.85	34725		46	4727.35	32990	
3	4729.82	34704		47	4727.26	32927	
4	4729.79	34683		48	4727.17	32865	
5	4729.76	34662		49	4727.07	32796	
6	4729.73	34642		50	4726.98	32733	
7	4729.70	34621		51	4726.89	32671	
8	4729.67	34600		52	4726.80	32608	
9	4729.64	34579		53	4726.71	32564	
9.3	4729.63	34572	Saw cut	54	4726.61	32476	
10	4729.60	34551		55	4726.52	32414	
11	4729.55	34517		55.9	4726.44	32358	Saw cut
12	4729.51	34489		56	4726.43	32351	
13	4729.46	34454		57	4726.34	32289	
14	4729.42	34426		58	4726.25	32226	
15	4729.37	34392		59	4726.16	32164	
16	4729.33	34364		60	4726.07	32102	
17	4729.28	34329		61	4725.98	32039	
18	4729.23	34295		62	4725.89	31977	
19	4729.19	34267		63	4725.80	31914	
19.2	4729.18	34260	Joint	64	4725.71	31852	
20	4729.13	34225		65	4725.62	31789	
21	4729.07	34184		66	4725.53	31727	
22	4729.01	34142		66.3	4725.50	31706	Spillway crest
23	4728.95	34100		67	4725.44	31670	
24	4728.89	34059		68	4725.35	31615	
25	4728.83	34017		68.8	4725.28	31573	Joint
26	4728.77	33975		69	4725.26	31561	
27	4728.71	33934		70	4725.16	31500	
28	4728.65	33892		71	4725.07	31446	
29	4728.59	33850		72	4724.97	31385	
30	4728.53	33809		73	4724.87	31324	
31	4728.47	33767		74	4724.78	31270	
31.1	4728.46	33760	Saw cut	75	4724.68	31209	
32	4728.39	33712		76	4724.58	31148	
33	4728.32	33663		77	4724.49	31094	
34	4728.24	33608		78	4724.39	31033	
35	4728.17	33559		79	4724.29	30973	
36	4728.10	33510		80	4724.20	30918	
37	4728.02	33455		80.7	4724.13	30876	Saw cut
38	4727.95	33406		81	4724.10	30858	
39	4727.87	33351		82	4724.00	30797	
40	4727.80	33302		83	4723.90	30736	
41	4727.73	33254		84	4723.80	30676	
42	4727.65	33198		85	4723.70	30615	
43	4727.58	33150		86	4723.60	30555	
43.1	4727.57	33143	Joint	87	4723.49	30488	
44	4727.52	33108		88	4723.39	30427	

TABLE A1. PAINTED ROCKS DAM SLOPE DISTANCE-ELEVATION-STORAGE TABLE

Dec. 1997

(Note: Measurements taken on the upstream side of the concrete boatramp.)

SLOPE DISTANCE FEET	ELEVATION FEET	STORAGE ACRE-FEET	NOTES	SLOPE DISTANCE FEET	ELEVATION FEET	STORAGE ACRE-FEET	NOTES
89	4723.29	30367		135	4718.26	27317	
90	4723.19	30306		136	4718.14	27244	
91	4723.09	30245		137	4718.03	27178	
92	4722.99	30184		138	4717.91	27105	
92.7	4722.92	30142	Joint	139	4717.80	27038	
93	4722.89	30124		140	4717.68	26965	
94	4722.78	30057		141	4717.57	26898	
95	4722.67	29990		142	4717.45	26826	
96	4722.56	29923		142.3	4717.42	26808	Joint
97	4722.45	29857		143	4717.34	26759	
98	4722.34	29790		144	4717.22	26686	
99	4722.23	29723		145	4717.10	26614	
100	4722.12	29657		146	4716.99	26547	
101	4722.01	29590		147	4716.87	26474	
102	4721.90	29523		148	4716.75	26402	
103	4721.79	29457		149	4716.64	26335	
104	4721.68	29390		150	4716.52	26262	
105	4721.57	29323		151	4716.40	26189	
105.6	4721.50	29281	Saw cut	152	4716.29	26123	
106	4721.46	29257		153	4716.17	26050	
107	4721.35	29190		154	4716.05	25977	
108	4721.24	29123		154.7	4715.97	25929	Saw cut
109	4721.13	29057		155	4715.94	25911	
110	4721.02	28990		156	4715.82	25838	
111	4720.91	28923		157	4715.71	25771	
112	4720.80	28857		158	4715.60	25705	
113	4720.70	28796		159	4715.49	25639	
114	4720.59	28730		160	4715.38	25581	
115	4720.48	28663		161	4715.26	25518	
116	4720.37	28596		162	4715.15	25461	
117	4720.26	28530		163	4715.04	25403	
118	4720.15	28463		164	4714.93	25345	
118.4	4720.11	28439	Joint	165	4714.82	25288	
119	4720.04	28396		166	4714.70	25225	
120	4719.93	28330		167	4714.59	25167	
121	4719.82	28263		167.2	4714.57	25157	Joint
122	4719.71	28196		168	4714.48	25110	
123	4719.60	28130		169	4714.36	25047	
124	4719.49	28063		170	4714.24	24984	
125	4719.38	27996		171	4714.13	24926	
126	4719.27	27930		172	4714.01	24863	
127	4719.16	27863		173	4713.90	24806	
128	4719.05	27796		174	4713.78	24743	
129	4718.94	27730		175	4713.66	24680	
130	4718.83	27663		176	4713.55	24622	
130.3	4718.80	27645	Joint	177	4713.43	24559	
131	4718.72	27596		178	4713.32	24502	
132	4718.60	27524		179	4713.20	24439	Saw cut
133	4718.49	27457		180	4713.09	24381	
134	4718.37	27384		181	4712.97	24318	

TABLE A1. PAINTED ROCKS DAM SLOPE DISTANCE-ELEVATION-STORAGE TABLE

Dec. 1997

(Note: Measurements taken on the upstream side of the concrete boatramp.)

SLOPE DISTANCE FEET	ELEVATION FEET	STORAGE ACRE-FEET	NOTES	SLOPE DISTANCE FEET	ELEVATION FEET	STORAGE ACRE-FEET	NOTES
182	4712.86	24260		229	4707.56	21482	
183	4712.74	24197		230	4707.45	21424	
184	4712.63	24139		231	4707.34	21366	
185	4712.52	24082		232	4707.23	21309	
186	4712.40	24019		233	4707.13	21256	
187	4712.29	23961		234	4707.02	21198	
188	4712.17	23898		235	4706.91	21141	
189	4712.06	23840		236	4706.80	21083	
190	4711.94	23778		237	4706.70	21031	
191	4711.83	23720	Joint	238	4706.59	20973	
192	4711.72	23662		239	4706.48	20916	
193	4711.61	23605		239.1	4706.47	20910	Joint
194	4711.51	23552		240	4706.37	20858	
195	4711.40	23495		241	4706.25	20795	
196	4711.29	23437		242	4706.14	20737	
197	4711.18	23379		243	4706.02	20674	
198	4711.07	23322		244	4705.91	20617	
199	4710.96	23264		245	4705.79	20554	
200	4710.86	23212		246	4705.68	20496	
201	4710.75	23154		247	4705.57	20439	
202	4710.64	23096		248	4705.45	20379	
203	4710.53	23039		249	4705.34	20330	
203.2	4710.51	23028	Saw cut	250	4705.22	20276	
204	4710.42	22981		250.2	4705.20	20267	Saw cut
205	4710.31	22923		251	4705.11	20226	
206	4710.19	22861		252	4705.01	20181	
207	4710.08	22803		253	4704.90	20131	
208	4709.97	22745		254	4704.79	20082	
209	4709.85	22682		255	4704.68	20032	
210	4709.74	22625		256	4704.57	19983	
211	4709.63	22567		257	4704.47	19938	
212	4709.51	22504		258	4704.36	19888	
213	4709.40	22447		259	4704.25	19839	
214	4709.29	22389		260	4704.14	19789	
215	4709.17	22326		261	4704.03	19740	
215.2	4709.15	22316	Joint	261.6	4703.97	19713	Joint
216	4709.06	22268		262	4703.93	19695	
217	4708.94	22206		263	4703.82	19645	
218	4708.82	22143		264	4703.71	19596	
219	4708.71	22085		265	4703.60	19546	
220	4708.59	22022		266	4703.49	19496	
221	4708.47	21959		267	4703.38	19447	
222	4708.36	21902		268	4703.27	19397	
223	4708.24	21839		269	4703.16	19348	
224	4708.12	21776		270	4703.06	19303	
225	4708.01	21718		271	4702.95	19253	
226	4707.89	21655		272	4702.84	19203	
227	4707.77	21592		273	4702.73	19154	
227.1	4707.76	21587	Saw cut	274	4702.62	19104	Saw cut
228	4707.66	21534		275	4702.51	19055	

TABLE A1. PAINTED ROCKS DAM SLOPE DISTANCE-ELEVATION-STORAGE TABLE

Dec. 1997

(Note: Measurements taken on the upstream side of the concrete boatramp.)

SLOPE DISTANCE FEET	ELEVATION FEET	STORAGE ACRE-FEET	NOTES	SLOPE DISTANCE FEET	ELEVATION FEET	STORAGE ACRE-FEET	NOTES
276	4702.41	19009		322.7	4697.59	16837	Saw cut
277	4702.30	18980		323	4697.57	16828	
278	4702.19	18910		324	4697.48	16787	
279	4702.08	18861		325	4697.40	16751	
280	4701.98	18815		326	4697.32	16715	
281	4701.87	18766		327	4697.24	16679	
282	4701.76	18716		328	4697.16	16643	
283	4701.65	18667		329	4697.08	16607	
284	4701.55	18622		330	4697.00	16571	
285	4701.44	18572		331	4696.92	16535	
286	4701.33	18523		332	4696.84	16499	
286.4	4701.29	18505	Joint	333	4696.76	16463	
287	4701.22	18473		333.8	4696.97	16558	Top last ring
288	4701.11	18424		334	4696.68	16427	
289	4701.00	18374		334.45	4696.64	16409	End conc.
290	4700.89	18325					
291	4700.77	18271					
292	4700.66	18221					
293	4700.55	18172					
294	4700.43	18117					
295	4700.32	18068					
296	4700.21	18018					
297	4700.10	17969					
298	4699.98	17914					
298.4	4699.94	17896	Saw cut				
299	4699.88	17869					
300	4699.78	17824					
301	4699.68	17779					
302	4699.58	17734					
303	4699.48	17689					
304	4699.38	17644					
305	4699.27	17594					
306	4699.17	17549					
307	4699.07	17504					
308	4698.97	17459					
309	4698.87	17414					
310	4698.77	17369					
310.6	4698.71	17342	Joint				
311	4698.67	17324					
312	4698.58	17283					
313	4698.49	17242					
314	4698.40	17202					
315	4698.30	17157					
316	4698.21	17116					
317	4698.12	17076					
318	4698.03	17035					
319	4697.93	16990					
320	4697.84	16949					
321	4697.75	16909					
322	4697.65	16864					

TABLE A1. PAINTED ROCKS DAM SLOPE DISTANCE-ELEVATION-STORAGE TABLE

Dec. 1997

(Note: Measurements begin at the ring at the bottom of the concrete boatramp.)

SLOPE DISTANCE FEET	ELEVATION FEET	STORAGE ACRE-FEET	NOTES	SLOPE DISTANCE FEET	ELEVATION FEET	STORAGE ACRE-FEET	NOTES
0	4696.97	16558	Top last ring	49	4691.60	14416	
0	4696.64	16409	End conc.	50	4691.67	14442	Top pin #1
1	4696.52	16355		50	4691.52	14386	Top block #1
2	4696.39	16296		51	4691.46	14363	
3	4696.27	16242		52	4691.40	14340	
4	4696.14	16184		53	4691.34	14317	
5	4696.02	16130		54	4691.28	14295	
6	4695.90	16075		55	4691.23	14276	
7	4695.77	16017		56	4691.17	14253	
8	4695.65	15963		57	4691.11	14230	
9	4695.52	15904		58	4691.05	14207	
10	4695.40	15857		59	4690.99	14185	
11	4695.28	15812		60	4690.93	14162	
12	4695.15	15762		61	4690.82	14120	
13	4695.03	15717		62	4690.71	14079	
14	4694.90	15668		63	4690.60	14037	
15	4694.78	15622		64	4690.49	13995	
16	4694.66	15577		65	4690.38	13954	
17	4694.53	15527		66	4690.28	13916	
18	4694.41	15482		67	4690.17	13874	
19	4694.28	15433		68	4690.06	13832	
20	4694.16	15387		69	4689.95	13791	
21	4694.04	15342		70	4689.84	13749	
22	4693.91	15292		71	4689.71	13700	
23	4693.79	15247		72	4689.57	13647	
24	4693.66	15198		73	4689.44	13597	
25	4693.54	15152		74	4689.30	13544	
26	4693.46	15122		75	4689.16	13491	
27	4693.38	15091		76	4689.03	13442	
28	4693.30	15061		77	4688.89	13389	
29	4693.22	15031		78	4688.76	13340	
30	4693.14	15000		79	4688.62	13286	
31	4693.06	14970		80	4688.49	13237	
32	4692.97	14936		81	4688.30	13165	
33	4692.89	14905		82	4688.11	13093	
34	4692.81	14875		83	4687.91	13017	
35	4692.73	14844		84	4687.72	12945	
36	4692.65	14814		85	4687.53	12872	
37	4692.57	14784		86	4687.25	12766	
38	4692.49	14753		87	4686.97	12660	
39	4692.41	14719		88	4686.70	12558	
40	4692.33	14693		89	4686.42	12452	
41	4692.25	14662		90	4686.14	12346	
42	4692.17	14632		91	4685.80	12217	
43	4692.09	14602		92	4685.45	12087	
44	4692.00	14568		93	4685.11	11977	
45	4691.92	14537		94	4684.76	11863	
46	4691.84	14507		95	4684.42	11753	
47	4691.76	14477		96	4684.19	11678	
48	4691.68	14446		97	4683.96	11604	

TABLE A1. PAINTED ROCKS DAM SLOPE DISTANCE-ELEVATION-STORAGE TABLE

Dec. 1997

(Note: Measurements begin at the ring at the bottom of the concrete boatramp.)

SLOPE DISTANCE FEET	ELEVATION FEET	STORAGE ACRE-FEET	NOTES	SLOPE DISTANCE FEET	ELEVATION FEET	STORAGE ACRE-FEET	NOTES
98	4683.72	11526		147	4677.47	9499	
99	4683.49	11451		148	4677.36	9464	
100	4683.38	11415	Top pin #2	149	4677.25	9428	
100	4683.26	11376	Top block #2	150	4677.27	9434	Top pin #3
101	4682.97	11282		150	4677.14	9392	Top block #3
102	4682.68	11188		151	4676.99	9343	
103	4682.39	11094		152	4676.84	9295	
104	4682.09	10997		153	4676.68	9243	
105	4681.80	10903		154	4676.53	9194	
106	4681.51	10809		155	4676.38	9145	
107	4681.41	10777		156	4676.23	9097	
108	4681.30	10741		157	4676.08	9048	
109	4681.20	10709		158	4675.92	8996	
110	4681.09	10673		159	4675.77	8947	
111	4681.06	10663		160	4675.62	8899	
112	4681.03	10654		161	4675.58	8886	
113	4681.00	10644		162	4675.54	8873	
114	4680.97	10634		163	4675.50	8860	
115	4680.94	10625		164	4675.46	8849	
116	4680.90	10612		165	4675.42	8838	
117	4680.87	10602		166	4675.38	8827	
118	4680.84	10592		167	4675.34	8817	
119	4680.81	10582		168	4675.30	8806	
120	4680.78	10573		169	4675.26	8795	
121	4680.65	10531		170	4675.22	8784	
122	4680.53	10492		171	4675.11	8754	
123	4680.40	10450		172	4674.99	8722	
124	4680.28	10411		173	4674.88	8692	
125	4680.15	10368		174	4674.77	8662	
126	4680.02	10326		175	4674.65	8630	
127	4679.90	10287		176	4674.54	8600	
128	4679.77	10245		177	4674.43	8570	
129	4679.65	10206		178	4674.32	8540	
130	4679.52	10164		179	4674.20	8508	
131	4679.39	10121		180	4674.09	8478	
132	4679.26	10079		181	4673.94	8437	
133	4679.14	10040		182	4673.79	8397	
134	4679.01	9998		183	4673.64	8356	
135	4678.88	9956		184	4673.49	8315	
136	4678.75	9914		185	4673.34	8275	
137	4678.62	9872		186	4673.20	8237	
138	4678.50	9833		187	4673.05	8196	
139	4678.37	9791		188	4672.90	8156	
140	4678.24	9749		189	4672.75	8115	
141	4678.13	9713		190	4672.60	8075	
142	4678.02	9677		191	4672.41	8024	
143	4677.91	9642		192	4672.23	7975	
144	4677.80	9606		193	4672.04	7923	
145	4677.69	9571		194	4671.86	7875	
146	4677.58	9535		195	4671.67	7823	

TABLE A1. PAINTED ROCKS DAM SLOPE DISTANCE-ELEVATION-STORAGE TABLE

Dec. 1997

(Note: Measurements begin at the ring at the bottom of the concrete boatramp.)

SLOPE DISTANCE FEET	ELEVATION FEET	STORAGE ACRE-FEET	NOTES	SLOPE DISTANCE FEET	ELEVATION FEET	STORAGE ACRE-FEET	NOTES
196	4671.48	7772		245	4667.04	6569	
197	4671.30	7723		246	4667.01	6559	
198	4671.11	7671		247	4666.99	6556	
199	4670.93	7623		248	4666.96	6548	
200	4670.81	7590	Top pin #4	249	4666.94	6542	
200	4670.72	7566	Top block #4	250	4666.91	6534	
201	4670.53	7514		251	4666.88	6526	
202	4670.34	7463		252	4666.85	6518	
203	4670.14	7408		253	4666.82	6510	
204	4669.95	7357		254	4666.79	6502	
205	4669.76	7305		255	4666.76	6493	
206	4669.57	7254		256	4666.73	6485	
207	4669.38	7202		257	4666.70	6477	
208	4669.18	7148		258	4666.67	6469	
209	4668.99	7097		259	4666.64	6461	
210	4668.80	7045		260	4666.61	6453	
211	4668.68	7013		261	4666.65	6464	
212	4668.57	6983		262	4666.68	6472	
213	4668.45	6950		263	4666.72	6483	
214	4668.34	6921		264	4666.75	6491	
215	4668.22	6888		265	4666.78	6499	
216	4668.10	6856		266	4666.82	6510	
217	4667.99	6826		267	4666.85	6518	
218	4667.87	6794		268	4666.89	6529	
219	4667.76	6764		269	4666.92	6537	
220	4667.64	6732		270	4666.96	6548	
221	4667.60	6721		271	4666.95	6545	
222	4667.55	6708		272	4666.95	6545	
223	4667.51	6694		273	4666.94	6542	
224	4667.47	6686		274	4666.94	6542	
225	4667.43	6675		275	4666.93	6540	
226	4667.38	6661		276	4666.92	6537	
227	4667.34	6651		277	4666.92	6537	
228	4667.30	6640		278	4666.91	6534	
229	4667.25	6626		279	4666.91	6534	
230	4667.21	6615		280	4666.90	6531	
231	4667.21	6615		281	4666.89	6529	
232	4667.20	6613		282	4666.88	6526	
233	4667.20	6613		283	4666.86	6521	
234	4667.19	6610		284	4666.85	6518	
235	4667.19	6610		285	4666.84	6515	
236	4667.19	6610		286	4666.83	6512	
237	4667.18	6607		287	4666.82	6510	
238	4667.18	6607		288	4666.80	6504	
239	4667.17	6605		289	4666.79	6502	
240	4667.17	6605		290	4666.78	6499	
241	4667.14	6596		291	4666.77	6496	
242	4667.12	6591		292	4666.77	6496	
243	4667.09	6583		293	4666.76	6493	
244	4667.07	6577		294	4666.75	6491	

TABLE A1. PAINTED ROCKS DAM SLOPE DISTANCE-ELEVATION-STORAGE TABLE

Dec. 1997

(Note: Measurements begin at the ring at the bottom of the concrete boatramp.)

SLOPE DISTANCE FEET	ELEVATION FEET	STORAGE ACRE-FEET	NOTES	SLOPE DISTANCE FEET	ELEVATION FEET	STORAGE ACRE-FEET	NOTES
295	4666.75	6491					
296	4666.74	6488					
297	4666.73	6485					
298	4666.72	6483					
299	4666.72	6483					
300	4666.71	6480					
301	4666.72	6483					
302	4666.72	6483					
303	4666.73	6485					
304	4666.74	6488					
305	4666.74	6488					
306	4666.75	6491					
307	4666.76	6493					
308	4666.77	6496					
309	4666.77	6496					
310	4666.78	6499					
311	4666.78	6499					
312	4666.78	6499					
313	4666.77	6496					
314	4666.77	6496					
315	4666.77	6496					
316	4666.77	6496					
317	4666.77	6496					
318	4666.76	6493					
319	4666.76	6493					
320	4666.76	6493					
321	4666.69	6474					
322	4666.63	6458					
323	4666.56	6439					
324	4666.49	6420					
325	4666.43	6404					
326	4666.36	6385					
327	4666.29	6366					
328	4666.22	6347					
329	4666.16	6331					
330	4666.09	6312					
331	4665.95	6274					
332	4665.81	6236					
333	4665.67	6198					
334	4665.54	6163					
335	4665.40	6130					
336	4665.26	6098					
337	4665.12	6067					
338	4664.98	6035					
339	4664.84	6004					
340	4664.71	5974					
341	4664.57	5943					
342	4664.43	5911					
343	4664.29	5880					

TABLE A2.
PAINTED ROCKS DAM
ACTIVE STORAGE IN ACRE-FEET

ELEV	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
4625						0	9	17	26	35
4626	43	52	60	69	78	87	95	104	113	121
4627	130	139	147	156	165	174	182	191	200	208
4628	217	226	234	243	252	261	269	278	287	295
4629	304	313	321	330	339	348	356	365	374	382
4630	391	400	408	417	425	434	443	451	460	468
4631	477	486	494	503	512	521	529	538	547	555
4632	564	572	581	589	598	607	616	624	633	642
4633	651	660	668	677	685	694	703	711	720	728
4634	737	746	754	763	771	780	788	797	806	815
4635	824	832	841	850	858	867	880	893	906	919
4636	932	945	958	971	984	997	1010	1023	1036	1049
4637	1062	1075	1088	1101	1114	1127	1140	1153	1166	1179
4638	1192	1205	1218	1231	1244	1257	1270	1283	1296	1309
4639	1322	1335	1348	1361	1374	1387	1400	1413	1426	1439
4640	1452	1465	1478	1491	1504	1517	1530	1543	1556	1569
4641	1582	1595	1608	1621	1634	1647	1660	1673	1686	1699
4642	1712	1725	1738	1751	1764	1777	1790	1803	1816	1829
4643	1842	1855	1868	1881	1894	1907	1920	1933	1946	1959
4644	1972	1985	1998	2011	2024	2037	2050	2063	2076	2089
4645	2102	2115	2128	2141	2154	2167	2184	2202	2219	2236
4646	2254	2271	2289	2306	2323	2341	2358	2375	2392	2410
4647	2427	2444	2462	2479	2497	2514	2531	2549	2566	2584
4648	2601	2618	2636	2653	2670	2688	2705	2722	2739	2757
4649	2774	2791	2809	2826	2844	2861	2878	2896	2913	2931
4650	2948	2965	2983	3000	3017	3035	3052	3069	3086	3104
4651	3121	3138	3156	3173	3190	3208	3225	3242	3259	3277
4652	3294	3311	3329	3346	3364	3381	3398	3416	3433	3451
4653	3468	3485	3503	3520	3537	3555	3572	3589	3606	3624
4654	3641	3658	3676	3693	3711	3728	3745	3763	3780	3798
4655	3815	3832	3849	3866	3884	3901	3924	3946	3969	3991
4656	4014	4036	4059	4081	4104	4126	4149	4171	4194	4216
4657	4239	4261	4284	4306	4329	4351	4374	4396	4419	4441
4658	4464	4487	4509	4532	4554	4577	4599	4622	4644	4667
4659	4689	4712	4734	4757	4779	4802	4824	4847	4869	4892
4660	4914	4937	4959	4982	5004	5027	5050	5072	5095	5117

TABLE A2.
PAINTED ROCKS DAM
ACTIVE STORAGE IN ACRE-FEET

ELEV	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
4661	5140	5163	5185	5208	5230	5253	5275	5298	5320	5343
4662	5365	5387	5410	5432	5455	5477	5500	5522	5545	5567
4663	5590	5613	5635	5658	5680	5703	5725	5748	5770	5793
4664	5815	5837	5860	5882	5905	5927	5950	5972	5995	6017
4665	6040	6062	6085	6107	6130	6152	6179	6206	6233	6260
4666	6288	6315	6342	6369	6396	6424	6451	6478	6505	6532
4667	6559	6586	6613	6640	6667	6694	6721	6748	6775	6802
4668	6829	6856	6883	6910	6937	6965	6992	7018	7045	7072
4669	7100	7127	7154	7181	7208	7236	7263	7290	7317	7344
4670	7371	7398	7425	7452	7479	7507	7533	7560	7587	7614
4671	7642	7669	7696	7723	7750	7777	7804	7831	7858	7885
4672	7913	7940	7967	7994	8021	8048	8075	8102	8129	8156
4673	8183	8210	8237	8264	8291	8318	8345	8372	8399	8426
4674	8453	8480	8507	8534	8561	8588	8616	8643	8670	8697
4675	8724	8752	8779	8806	8833	8860	8892	8925	8957	8990
4676	9022	9054	9087	9119	9152	9184	9217	9249	9282	9314
4677	9347	9379	9412	9444	9477	9509	9541	9574	9606	9639
4678	9671	9703	9736	9768	9801	9833	9865	9898	9930	9963
4679	9995	10028	10060	10093	10125	10158	10190	10223	10255	10288
4680	10320	10352	10385	10417	10450	10482	10514	10547	10579	10612
4681	10644	10676	10709	10741	10774	10806	10838	10871	10903	10936
4682	10968	11000	11033	11065	11098	11130	11162	11195	11227	11260
4683	11292	11325	11357	11390	11422	11455	11487	11520	11552	11585
4684	11617	11649	11682	11714	11747	11779	11811	11844	11876	11909
4685	11941	11973	12006	12038	12071	12103	12141	12179	12217	12255
4686	12293	12331	12369	12407	12445	12483	12520	12558	12596	12634
4687	12672	12710	12748	12786	12824	12862	12899	12937	12975	13013
4688	13051	13089	13127	13165	13203	13241	13279	13317	13355	13393
4689	13431	13469	13507	13545	13583	13621	13658	13696	13734	13772
4690	13810	13848	13886	13924	13962	14000	14037	14075	14113	14151
4691	14189	14227	14265	14303	14341	14379	14416	14454	14492	14530
4692	14568	14606	14644	14682	14720	14758	14795	14833	14871	14909
4693	14947	14985	15023	15061	15099	15137	15175	15213	15251	15289
4694	15327	15365	15403	15441	15479	15517	15554	15592	15630	15668
4695	15706	15743	15781	15819	15857	15895	15940	15985	16030	16075

TABLE A2.
PAINTED ROCKS DAM
ACTIVE STORAGE IN ACRE-FEET

ELEV	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
4696	16121	16166	16211	16256	16301	16346	16391	16436	16481	16526
4697	16571	16616	16661	16706	16751	16796	16841	16886	16931	16976
4698	17021	17066	17111	17156	17201	17246	17292	17337	17382	17427
4699	17472	17517	17562	17607	17652	17697	17743	17788	17833	17878
4700	17923	17968	18013	18058	18103	18148	18194	18239	18284	18329
4701	18374	18419	18464	18509	18554	18599	18644	18689	18734	18779
4702	18824	18869	18914	18959	19004	19049	19095	19140	19185	19230
4703	19275	19320	19365	19410	19455	19500	19546	19591	19636	19681
4704	19726	19771	19816	19861	19906	19951	19996	20041	20086	20131
4705	20176	20222	20267	20312	20357	20402	20454	20507	20559	20612
4706	20664	20716	20769	20821	20874	20926	20978	21031	21083	21136
4707	21188	21240	21293	21345	21398	21450	21502	21555	21607	21660
4708	21713	21765	21818	21870	21923	21975	22027	22080	22132	22185
4709	22237	22289	22342	22394	22447	22499	22551	22604	22656	22709
4710	22761	22813	22866	22918	22971	23023	23075	23128	23180	23233
4711	23285	23337	23390	23442	23495	23547	23599	23652	23704	23757
4712	23809	23861	23914	23966	24019	24071	24123	24176	24228	24281
4713	24334	24386	24439	24491	24544	24596	24648	24701	24753	24806
4714	24858	24910	24963	25015	25068	25120	25172	25225	25277	25330
4715	25382	25435	25487	25539	25592	25644	25705	25765	25826	25887
4716	25947	26008	26068	26129	26189	26250	26311	26371	26432	26492
4717	26553	26614	26674	26735	26795	26856	26917	26977	27038	27098
4718	27159	27220	27280	27341	27401	27462	27523	27583	27644	27704
4719	27766	27827	27887	27948	28008	28069	28130	28190	28251	28311
4720	28372	28433	28493	28554	28614	28675	28736	28796	28857	28917
4721	28978	29039	29099	29160	29220	29281	29281	29281	29281	29281
4722	29584	29645	29705	29766	29826	29887	29948	30008	30069	30129
4723	30190	30251	30311	30372	30433	30493	30554	30615	30676	30736
4724	30797	30858	30918	30979	31040	31100	31161	31222	31283	31343
4725	31403	31464	31524	31585	31645	31706	31775	31845	31914	31984
4726	32053	32122	32192	32261	32331	32400	32469	32539	32608	32678
4727	32747	32816	32886	32955	33025	33094	33163	33233	33302	33372
4728	33441	33510	33580	33649	33719	33788	33857	33927	33996	34066
4729	34135	34204	34274	34343	34413	34482	34551	34621	34690	34760
4730	34829	34898	34968	35037	35107	35176				

TABLE A3. PAINTED ROCKS DAM SPILLWAY RATING TABLE

Elevation Feet	Discharge cfs
4,725.5	0
4727.5	1460
4729.5	4320
4731.5	8270
4733.5	13220
4735.5	19120
4737.5	25640
4739.5	32640
4743.07	42000

PAINTED ROCKS DAM SPILLWAY RATING CURVE

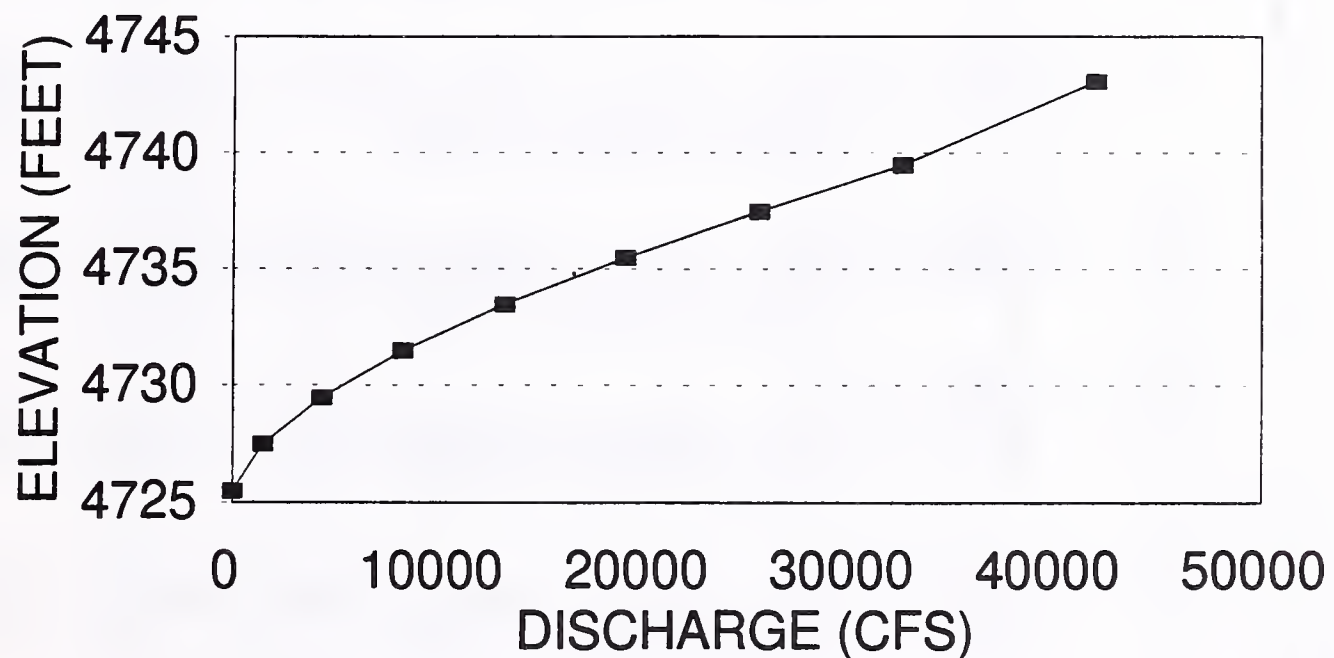


TABLE A4. WEST FORK BITTERROOT RIVER (NEAR CONNOR) RATING TABLE

12342500

WEST FORK BITTERROOT RIVER NEAR CONNER, MT.

OFFSET: .00 BREAK, OFFSET: (.40,.00)

UNITED STATES DEPARTMENT OF INTERIOR - GEOLOGICAL SURVEY - WATER RESOURCES DIVISION

EXPANDED RATING TABLE

DATE PROCESSED: 03-11-1998 @ 08:57 BY pkajpdr

DD: 2 TYPE: 001 RATING NO: 6.0

START DATE/TIME: 10-01-96 (0015)

BASED ON

DISCHARGE MEASUREMENTS, NOS

AND

AND IS

WELL DEFINED BETWEEN

AND

CFS

GAGE HEIGHT (FEET)	DISCHARGE IN CUBIC FEET PER SECOND					(STANDARD PRECISION)				
	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
.40	3.5*	3.7	4.0	4.3	4.5	4.8	5.1	5.4	5.8	6.1
.50	6.5	6.8	7.2	7.6	8.0	8.4	8.8	9.2	9.7	10.2
.60	10.6	11.1	11.6	12.2	12.7	13.3	13.8	14.4	15.0	15.6
.70	16.3	16.9	17.6	18.2	18.9	19.6	20.4	21.1	21.9	22.6
.80	23.4	24.3	25.1	25.9	26.8	27.7	28.6	29.5	30.4	31.4
.90	32.4	33.4	34.4	35.4	36.5	37.6	38.7	39.8	40.9	42.1
1.00	43.2	44.4	45.7	46.9	48.2	49.4	50.7	52.1	53.4	54.8
1.10	56.2	57.6	59.0	60.5	61.9	63.5	65.0	66.5	68.1	69.7
1.20	71.3	73.0	74.6	76.3	78.0	79.8	81.5	83.3	85.1	87.0
1.30	88.8	90.7	92.6	94.6	96.5	98.5	101	103	105	107
1.40	109	111	113	115	118	120	122	124	127	129
1.50	132	134	136	139	141	144	146	149	152	154
1.60	157	160	162	165	168	171	174	177	180	182
1.70	185	188	191	195	198	201	204	207	210	214
1.80	217	220	224	227	230	234	237	241	244	248
1.90	252	255	259	263	266	270	274	278	282	286
2.00	290	294	298	302	306	310	314	318	323	327
2.10	331	335	340	344	349	353	358	362	367	372
2.20	376	381	386	390	395	400	405	410	415	420
2.30	425*	430	435	440	445	450	455	460	465	470
2.40	475	480	485	490	496	501	506	512	517	523
2.50	528	534	539	545	550	556	562	568	573	579
2.60	585*	591	597	603	609	615	621	627	633	639
2.70	645*	651	657	663	669	676	682	688	694	701
2.80	707*	713	719	726	732	738	744	751	757	764
2.90	770*	776	783	789	795	802	808	814	821	827
3.00	834*	840	847	853	860	867	873	880	887	893
3.10	900*	907	913	920	927	933	940	947	953	960
3.20	967	974	981	988	995	1000	1010	1020	1030	1040
3.30	1040	1040	1050	1060	1070	1070	1080	1090	1090	1100
3.40	1110	1120	1120	1130	1140	1150	1150	1160	1170	1180
3.50	1180	1190	1200	1210	1220	1220	1230	1240	1250	1260
3.60	1260	1270	1280	1290	1300	1300	1310	1320	1330	1340
3.70	1340	1350	1360	1370	1380	1390	1390	1400	1410	1420
3.80	1430	1440	1440	1450	1460	1470	1480	1490	1500	1510
3.90	1510	1520	1530	1540	1550	1560	1570	1580	1590	1590
4.00	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690

PAGE 1

TYPE: LOG

TABLE A4. WEST FORK BITTERROOT RIVER (NEAR CONNOR) RATING TABLE

UNITED STATES DEPARTMENT OF INTERIOR - GEOLOGICAL SURVEY - WATER RESOURCES DIVISION									
EXPANDED RATING TABLE									
12342500	DATE PROCESSED: 03-11-1998 @ 08:57 BY pkarpex								
WEST FORK BITTERROOT RIVER NEAR CONNOR, MT.	DD: 2 TYPE: 001 RATING NO: 6.0								
OFFSET: .00 BREAK.OFFSET: (.40,.00)	START DATE/TIME: 10-01-96 (0015)								
	TYPE: LOG								
	PAGE 2								
GAGE HEIGHT (FEET)	DISCHARGE IN CUBIC FEET PER SECOND								
	.00	.01	.02	.03	.04	.05	(STANDARD PRECISION)		
							.06	.07	.08
									.09
4.10	1700	1710	1710	1720	1730	1740	1750	1760	1770
4.20	1790	1800	1810	1820	1830	1840	1850	1860	1870
4.30	1890	1900	1910	1920	1930	1940	1950	1960	1970
4.40	1990	2000	2010	2020	2030	2040	2050	2060	2070
4.50	2090	2100	2120	2130	2140	2150	2160	2170	2180
4.60	2200	2210	2220	2230	2240	2260	2270	2280	2290
4.70	2310	2320	2330	2340	2360	2370	2380	2390	2400
4.80	2420	2440	2450	2460	2470	2480	2490	2500	2520
4.90	2540	2550	2560	2580	2590	2600	2610	2620	2630
5.00	2660	2670	2680	2700	2710	2720	2730	2740	2760
5.10	2780	2790	2810	2820	2830	2840	2860	2870	2880
5.20	2910	2920	2930	2940	2960	2970	2980	3000	3010
5.30	3030	3050	3060	3070	3090	3100	3110	3130	3140
5.40	3170	3180	3190	3210	3220	3230	3250	3260	3270
5.50	3300*								

Note: This gaging station is located about 1/2 mile below the dam.

TABLE A5. OVERWHICH CREEK INFLOW RATING TABLE

GAGE HEIGHT (FEET)	DISCHARGE (CUBIC FEET PER SECOND)									
	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.2	0.35	0.41	0.47	0.53	0.61	0.68	0.77	0.86	0.96	1.06
0.3	1.17	1.29	1.42	1.55	1.69	1.85	2.01	2.18	2.35	2.54
0.4	2.74	2.95	3.16	3.39	3.63	3.88	4.14	4.41	4.69	4.99
0.5	5.29	5.61	5.94	6.28	6.64	7.01	7.39	7.79	8.20	8.63
0.6	9.06	9.52	9.99	10.47	10.97	11.48	12.01	12.55	13.12	13.69
0.7	14.29	14.90	15.53	16.17	16.83	17.51	18.21	18.93	19.66	20.42
0.8	21.19	21.98	22.79	23.62	24.47	25.34	26.23	27.14	28.07	29.03
0.9	30.00	30.99	32.01	33.05	34.11	35.19	36.30	37.42	38.57	39.75
1.0	40.94	42.16	43.41	44.68	45.97	47.29	48.63	50.00	51.39	52.80
1.1	54.25	55.72	57.21	58.73	60.28	61.85	63.46	65.08	66.74	68.42
1.2	70.13	71.87	73.64	75.44	77.26	79.12	81.00	82.91	84.85	86.82
1.3	88.83	90.86	92.92	95.01	97.14	99.29	101.48	103.70	105.95	108.23
1.4	110.55	112.89	115.27	117.69	120.13	122.61	125.13	127.67	130.25	132.87
1.5	135.52	138.20	140.92	143.68	146.47	149.29	152.15	155.05	157.98	160.95
1.6	163.96	167.00	170.08	173.20	176.36	179.55	182.78	186.05	189.36	192.70
1.7	196.09	199.51	202.98	206.48	210.03	213.61	217.23	220.90	224.60	228.34
1.8	232.13	235.96	239.83	243.74	247.69	251.69	255.72	259.80	263.93	268.09
1.9	272.30	276.55	280.85	285.19	289.57	294.00	298.47	302.99	307.55	312.16
2.0	316.81	321.51	326.26	331.05	335.89	340.77	345.70	350.68	355.70	360.77
2.1	365.89	371.06	376.27	381.54	386.85	392.21	397.62	403.08	408.59	414.14
2.2	419.75	425.41	431.12	436.87	442.68	448.54	454.45	460.41	466.43	472.49
2.3	478.61	484.78	491.00	497.27	503.60	509.98	516.41	522.89	529.43	536.03
2.4	542.68	549.38	556.13	562.94	569.81	576.73	583.71	590.74	597.83	604.97
2.5	612.17	619.43	626.74	634.11	641.54	649.02	656.57	664.17	671.82	679.54
2.6	687.31	695.15	703.04	710.99	719.00	727.07	735.20	743.38	751.63	759.94
2.7	768.31	776.74	785.23	793.79	802.40	811.07	819.81	828.61	837.47	846.40
2.8	855.38	864.43	873.54	882.72	891.96	901.26	910.63	920.06	929.56	939.12
2.9	948.74	958.43	968.18	978.01	987.89	997.84	1007.86	1017.94	1028.10	1038.31
3.0	1048.60	1058.95	1069.37	1079.85	1090.41	1101.03	1111.72	1122.48	1133.31	1144.20
3.1	1155.17	1166.20	1177.31	1188.48	1199.72	1211.04	1222.42	1233.88	1245.40	1257.00
3.2	1268.66	1280.40	1292.21	1304.10	1316.05	1328.08	1340.18	1352.35	1364.59	1376.91
3.3	1389.30	1401.76	1414.30	1426.91	1439.60	1452.36	1465.20	1478.11	1491.09	1504.15
3.4	1517.29	1530.50	1543.78	1557.15	1570.59	1584.10	1597.69	1611.36	1625.11	1638.93
3.5	1652.83	1666.81	1680.87	1695.01	1709.22	1723.51	1737.88	1752.33	1766.86	1781.47
3.6	1796.16	1810.92	1825.77	1840.70	1855.71	1870.80	1885.97	1901.22	1916.55	1931.97
3.7	1947.46	1963.04	1978.70	1994.45	2010.27	2026.18	2042.17	2058.24	2074.40	2090.64
3.8	2106.97	2123.38	2139.87	2156.45	2173.11	2189.86	2206.69	2223.61	2240.62	2257.70
3.9	2274.88	2292.14	2309.49	2326.92	2344.45	2362.05	2379.75	2397.53	2415.40	2433.36
4.0	2451.41	2469.54	2487.77	2506.08	2524.48	2542.97	2561.55	2580.22	2598.98	2617.83
4.1	2636.77	2655.80	2674.92	2694.13	2713.43	2732.82	2752.30	2771.88	2791.55	2811.31
4.2	2831.16	2851.11	2871.14	2891.27	2911.50	2931.81	2952.22	2972.73	2993.32	3014.02
4.3	3034.80	3055.69	3076.66	3097.73	3118.90	3140.16	3161.52	3182.97	3204.52	3226.16
4.4	3247.90	3269.74	3291.68	3313.71	3335.84	3358.07	3380.39	3402.81	3425.33	3447.95
4.5	3470.67	3493.49	3516.40	3539.42	3562.53	3585.74	3609.06	3632.47	3655.98	3679.60

Table created 5/6/1998 by Ron Roman, Montana DNRC -- Water Resources Division.

The regression equation of log discharge on log gage height is:

$$\text{LOG } Q = 2.95 \times \text{LOG (GAGE HEIGHT)} + 1.61$$

This equation has an r-squared value of 1.00

The arithmetic form of this equation is: $Q = 40.94 \times ((\text{GAGE HEIGHT})^{**} 2.95)$

TABLE A6. BLUE JOINT CREEK INFLOW RATING TABLE

GAGE HEIGHT (FEET)	DISCHARGE (CUBIC FEET PER SECOND)									
	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.1	3.75	4.29	4.85	5.42	6.02	6.64	7.27	7.91	8.58	9.25
0.2	9.95	10.65	11.37	12.11	12.86	13.62	14.39	15.17	15.97	16.78
0.3	17.60	18.43	19.27	20.12	20.99	21.86	22.75	23.64	24.54	25.46
0.4	26.38	27.31	28.26	29.21	30.17	31.14	32.11	33.10	34.10	35.10
0.5	36.11	37.13	38.16	39.20	40.24	41.30	42.36	43.42	44.50	45.58
0.6	46.67	47.77	48.88	49.99	51.11	52.24	53.37	54.52	55.66	56.82
0.7	57.98	59.15	60.33	61.51	62.70	63.89	65.10	66.30	67.52	68.74
0.8	69.97	71.20	72.44	73.69	74.94	76.20	77.46	78.73	80.01	81.29
0.9	82.58	83.88	85.18	86.48	87.79	89.11	90.43	91.76	93.09	94.43
1.0	95.78	97.13	98.49	99.85	101.21	102.59	103.96	105.35	106.73	108.13
1.1	109.53	110.93	112.34	113.75	115.17	116.60	118.03	119.46	120.90	122.34
1.2	123.79	125.25	126.71	128.17	129.64	131.11	132.59	134.07	135.56	137.06
1.3	138.55	140.06	141.56	143.07	144.59	146.11	147.64	149.17	150.70	152.24
1.4	153.78	155.33	156.88	158.44	160.00	161.57	163.14	164.71	166.29	167.87
1.5	169.46	171.05	172.65	174.25	175.86	177.46	179.08	180.70	182.32	183.94
1.6	185.57	187.21	188.85	190.49	192.13	193.79	195.44	197.10	198.76	200.43
1.7	202.10	203.77	205.45	207.14	208.82	210.51	212.21	213.91	215.61	217.32
1.8	219.03	220.74	222.46	224.18	225.91	227.64	229.37	231.11	232.85	234.59
1.9	236.34	238.09	239.85	241.61	243.37	245.14	246.91	248.69	250.47	252.25
2.0	254.03	255.82	257.61	259.41	261.21	263.02	264.82	266.63	268.45	270.27
2.1	272.09	273.91	275.74	277.57	279.41	281.25	283.09	284.94	286.79	288.64
2.2	290.50	292.35	294.22	296.08	297.95	299.83	301.71	303.59	305.47	307.36
2.3	309.25	311.14	313.04	314.94	316.84	318.75	320.66	322.57	324.49	326.41
2.4	328.33	330.26	332.19	334.12	336.06	338.00	339.94	341.89	343.84	345.79
2.5	347.75	349.71	351.67	353.63	355.60	357.57	359.55	361.53	363.51	365.49
2.6	367.48	369.47	371.46	373.46	375.46	377.46	379.47	381.48	383.49	385.51
2.7	387.52	389.55	391.57	393.60	395.63	397.66	399.70	401.74	403.78	405.83
2.8	407.87	409.92	411.98	414.04	416.10	418.16	420.23	422.30	424.37	426.44
2.9	428.52	430.60	432.68	434.77	436.86	438.95	441.05	443.15	445.25	447.35
3.0	449.46	451.57	453.68	455.80	457.92	460.04	462.16	464.29	466.42	468.55
3.1	470.68	472.82	474.96	477.11	479.25	481.40	483.55	485.71	487.87	490.03
3.2	492.19	494.36	496.52	498.70	500.87	503.05	505.23	507.41	509.59	511.78
3.3	513.97	516.17	518.36	520.56	522.76	524.96	527.17	529.38	531.59	533.81
3.4	536.02	538.24	540.47	542.69	544.92	547.15	549.38	551.62	553.86	556.10
3.5	558.34	560.59	562.84	565.09	567.34	569.60	571.86	574.12	576.38	578.65
3.6	580.92	583.19	585.47	587.74	590.02	592.31	594.59	596.88	599.17	601.46
3.7	603.76	606.05	608.35	610.66	612.96	615.27	617.58	619.89	622.21	624.52
3.8	626.84	629.17	631.49	633.82	636.15	638.48	640.82	643.15	645.49	647.84
3.9	650.18	652.53	654.88	657.23	659.59	661.94	664.30	666.66	669.03	671.39
4.0	673.76	676.14	678.51	680.89	683.26	685.65	688.03	690.42	692.80	695.19

Table created 6/15/1998 by Ron Roman, Montana DNRC -- Water Resources Division.

The regression equation of log discharge on log gage height is:

$$\text{LOG } Q = 2.95 \times \text{LOG (GAGE HEIGHT)} + 1.61$$

This equation has an r-squared value of 1.00

The arithmetic form of this equation is: $Q = 40.94 \times ((\text{GAGE HEIGHT})^{**} 2.95)$

TABLE A7. WEST FORK BITTERROOT RIVER INFLOW RATING TABLE

GAGE HEIGHT (FEET)	DISCHARGE (CUBIC FEET PER SECOND)									
	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.2	1.59	1.77	1.96	2.16	2.37	2.60	2.83	3.08	3.33	3.60
0.3	3.88	4.17	4.47	4.79	5.11	5.45	5.80	6.16	6.53	6.91
0.4	7.31	7.72	8.14	8.57	9.01	9.47	9.94	10.42	10.92	11.42
0.5	11.94	12.48	13.02	13.58	14.15	14.73	15.33	15.94	16.56	17.19
0.6	17.84	18.50	19.18	19.86	20.56	21.28	22.01	22.75	23.50	24.27
0.7	25.05	25.84	26.65	27.47	28.31	29.16	30.02	30.89	31.78	32.69
0.8	33.61	34.54	35.48	36.44	37.41	38.40	39.40	40.42	41.45	42.49
0.9	43.55	44.62	45.71	46.81	47.92	49.05	50.20	51.35	52.53	53.71
1	54.92	56.13	57.36	58.61	59.87	61.14	62.43	63.73	65.05	66.38
1.1	67.73	69.10	70.47	71.87	73.27	74.69	76.13	77.58	79.05	80.53
1.2	82.03	83.54	85.07	86.61	88.17	89.74	91.33	92.93	94.55	96.18
1.3	97.83	99.49	101.17	102.87	104.58	106.30	108.05	109.80	111.57	113.36
1.4	115.16	116.98	118.81	120.66	122.53	124.41	126.31	128.22	130.15	132.09
1.5	134.05	136.02	138.01	140.02	142.04	144.08	146.13	148.20	150.29	152.39
1.6	154.51	156.64	158.79	160.95	163.14	165.33	167.55	169.78	172.02	174.28
1.7	176.56	178.86	181.17	183.49	185.83	188.19	190.57	192.96	195.37	197.79
1.8	200.23	202.69	205.16	207.65	210.15	212.68	215.22	217.77	220.34	222.93
1.9	225.53	228.15	230.79	233.45	236.12	238.80	241.51	244.23	246.96	249.72
2	252.49	255.27	258.08	260.90	263.74	266.59	269.46	272.35	275.25	278.17
2.1	281.11	284.06	287.04	290.02	293.03	296.05	299.09	302.15	305.22	308.31
2.2	311.42	314.54	317.68	320.84	324.01	327.21	330.42	333.64	336.89	340.15
2.3	343.42	346.72	350.03	353.36	356.71	360.07	363.45	366.85	370.26	373.70
2.4	377.15	380.61	384.10	387.60	391.12	394.66	398.21	401.78	405.37	408.98
2.5	412.60	416.24	419.90	423.58	427.27	430.98	434.71	438.46	442.22	446.00
2.6	449.80	453.62	457.45	461.30	465.17	469.06	472.96	476.89	480.83	484.78
2.7	488.76	492.75	496.76	500.79	504.84	508.90	512.98	517.08	521.20	525.33
2.8	529.49	533.66	537.85	542.05	546.28	550.52	554.78	559.06	563.36	567.67
2.9	572.00	576.35	580.72	585.11	589.51	593.93	598.37	602.83	607.31	611.80
3	616.31	620.84	625.39	629.96	634.55	639.15	643.77	648.41	653.07	657.74
3.1	662.44	667.15	671.88	676.63	681.40	686.18	690.98	695.81	700.65	705.50
3.2	710.38	715.28	720.19	725.12	730.07	735.04	740.03	745.03	750.06	755.10
3.3	760.16	765.24	770.34	775.45	780.59	785.74	790.91	796.10	801.31	806.54
3.4	811.78	817.05	822.33	827.63	832.95	838.29	843.65	849.02	854.42	859.83
3.5	865.26	870.71	876.18	881.67	887.17	892.70	898.24	903.81	909.39	914.99
3.6	920.61	926.24	931.90	937.58	943.27	948.98	954.71	960.46	966.23	972.02
3.7	977.83	983.66	989.50	995.36	1001.25	1007.15	1013.07	1019.01	1024.97	1030.94
3.8	1036.94	1042.96	1048.99	1055.04	1061.12	1067.21	1073.32	1079.45	1085.60	1091.76
3.9	1097.95	1104.16	1110.38	1116.62	1122.89	1129.17	1135.47	1141.79	1148.13	1154.49
4	1160.87	1167.26	1173.68	1180.12	1186.57	1193.04	1199.54	1206.05	1212.58	1219.13
4.1	1225.70	1232.29	1238.90	1245.53	1252.18	1258.84	1265.53	1272.23	1278.96	1285.70
4.2	1292.46	1299.25	1306.05	1312.87	1319.71	1326.57	1333.45	1340.35	1347.27	1354.21
4.3	1361.16	1368.14	1375.14	1382.15	1389.19	1396.24	1403.32	1410.41	1417.52	1424.66
4.4	1431.81	1438.98	1446.17	1453.38	1460.61	1467.86	1475.13	1482.42	1489.73	1497.06
4.5	1504.41	1511.77	1519.16	1526.57	1534.00	1541.44	1548.91	1556.39	1563.90	1571.42
4.6	1578.97	1586.53	1594.12	1601.72	1609.35	1616.99	1624.65	1632.34	1640.04	1647.76
4.7	1655.50	1663.27	1671.05	1678.85	1686.67	1694.51	1702.38	1710.26	1718.16	1726.08
4.8	1734.02	1741.98	1749.96	1757.96	1765.98	1774.02	1782.08	1790.16	1798.27	1806.39
4.9	1814.53	1822.69	1830.87	1839.07	1847.29	1855.53	1863.79	1872.07	1880.37	1888.69
5	1897.03	1905.39	1913.77	1922.17	1930.59	1939.03	1947.49	1955.97	1964.47	1973.00

Table created 5/6/1998 by Ron Roman, Montana DNRC -- Water Resources Division.

The regression equation of log discharge on log gage height is: $\text{LOG } Q = 2.95 \times \text{LOG (Gage Height)} + 1.61$
 This equation has an r-squared value of 1.00

The arithmetic form of this equation is: $Q = 40.94 \times ((\text{GAGE HEIGHT})^{**} 2.95)$

APPENDIX B
INSPECTION CHECKLIST

DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION
DAM SAFETY INSPECTION REPORT

NAME OF DAM _____
DATE INSPECTED _____

INVENTORY NO. _____
HAZARD CATEGORY _____
TYPE OF DAM _____
YEAR BUILT _____

OWNER _____
OPERATOR _____
STREAM _____
DRAINAGE AREA _____

Reservoir Storage Status

	Water Surface Elevation (feet)	Storage (acre-feet)
At time of inspection	_____	_____
At spillway crest	_____	_____
At min. dam crest elevation	_____	_____
Flashboard crest elevation	_____	_____

ITEM	YES	NO	REMARKS	*ICC
------	-----	----	---------	------

1. EMBANKMENT

A. Crest -- Height= Length= Width=

(1) Any visual settlements?				3
(2) Any misalignments?				4
(3) Any cracking?				4
(4) Any traffic damage?				5
(5) Other?				7

NOTE: *ICC stands for "Inventory Comment Code" which is found on the Inventory of Montana Dams. This comment code is for use by the Dam Safety Section.

ITEM	YES	NO	REMARKS	*ICC
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1. EMBANKMENT (continued)

B. Upstream Face -- Slope=

(1) Any erosion?				13
(2) Any longitudinal cracks?				9
(3) Any transverse cracks?				9
(4) Is riprap protection adequate?				10
(5) Any stone deterioration?				10
(6) Any visual settlement, sloughing, slumps, depressions or bulges?				9
(7) Adequate grass cover?				14
(8) Debris on the dam face?				15
(9) Other?				16

C. Downstream Face--Slope=

(1) Any erosion?				22
(2) Any longitudinal cracks?				19
(3) Any transverse cracks?				19
(4) Any visual settlement, sloughing, slumps, depressions or bulges?				19
(5) Is the toe drain dry?				31
(6) Are the relief wells flowing?				31
(7) Any boils at the toe?				18
(8) Any seepage areas?				17, 18
(9) Any traffic or animal damage?				22
(10) Any burrowing animals?				21
(11) Adequate grass cover?				24
(12) Other?				25

D. Amount and Type of Vegetation on the Dam

	14, 24
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ITEM	YES	NO	REMARKS	*ICC
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2. ABUTMENT CONTACTS

A) Any erosion?				12, 20
B) Any visual differential movement?				12, 20
C) Any cracks?				12, 20
D) Any seepage present?				36
E) Other?				16, 25

3. OUTLET WORKS

A. Intake Structure -- Size=

(1) Any settlement?				70
(2) Any tilting?				70
(3) Do concrete surfaces show:				
a. Spalling?				70
b. Cracking?				70
c. Erosion?				70
d. Exposed reinforcement?				70
(4) Do joints show:				
a. Displacement or offset?				70
b. Loss of joint material?				70
c. Leakage?				70
(5) Metal appurtenances:				
a. Any corrosion present?				70
b. Any breakage present?				71
(6) Trash rack?				70
a. Condition?				70
b. Anchor system secure?				71
(7) Other?				71

ITEM	YES	NO	REMARKS	*ICC
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3. OUTLET WORKS (continued)

B. Conduit -- Type = Size =

(1) Do concrete surfaces show:				
a. Spalling?				76
b. Cracking?				76
c. Erosion?				76
d. Exposed reinforcement?				76
(2) Do joints show:				
a. Displacement or offset?				76
b. Loss of joint material?				76
c. Leakage?				76
(3) Is the conduit metal?				76
a. Any corrosion present?				76
b. Protective coatings adequate?				76
(4) Is the conduit misaligned?				76
(5) Any calcium deposits?				76
(6) Other?				76

C. Gates and Tower

(1) Gates:				73, 74
a. Size: Operating:	Emergency:			
b. Type: Operating:	Emergency:			
(2) Controls operational?				75
(3) Controls lubricated?				75
(4) Operational problems?				75
(5) Leakage around gates?				73, 74
(6) Condition of gate seals?				73, 74
(7) Any cavitation damage? If so, describe?				73, 74
(8) Describe air vent-size and condition.				73, 74

ITEM	YES	NO	REMARKS	*ICC
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3. OUTLET WORKS (continued)

C. Gates and Tower (continued)

(9) Is there a jet pump?				82
a. Is it operational?				82
b. Leakage?				82
(10) Is the tower dry? _____ wet? _____				77
(11) Any seepage in the tower?				77
(12) Condition of the tower?				77
(13) Any safety problems?				77
(14) Ladder in good condition?				77
(15) Condition of the gate house?				81
(16) Emergency plan completed for the dam?				43
a. Posted in the gatehouse?				43
(17) Other?				82

D. Stilling Basin

(1) Do concrete surfaces show:				
a. Spalling?				82
b. Cracking?				62
c. Erosion?				62
d. Exposed reinforcement?				62
(2) Do joints show:				
a. Displacement or offset?				62
b. Loss of joint material?				62
c. Leakage?				62
(3) Do energy dissipators show:				
a. Signs of deterioration?				62
b. Are they covered with debris?				62
(4) Other?				63

ITEM	YES	NO	REMARKS	*ICC
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3. OUTLET WORKS (continued)

E. Downstream Channel

(1) Is the channel:				
a. Eroding or backcutting?				38
b. Sloughing?				38
c. Obstructed?				40
(2) Is released water:				
a. Undercutting the outlet?				52, 62
b. Eroding the embankment?				52, 62
(3) Other?				56,63

4. SPILLWAY

A. Description

(1) Location?				N/A
(2) Type of Spillway?				N/A
(3) Size of Spillway?				N/A
(4) Spillway lining?				N/A
(5) Is there a weir?				61
(6) Is the spillway in good condition?				N/A
(7) Any drains?				N/A
a. Describe the condition of drains.				64

B. Does spillway show:

(1) Any cracking concrete?				57, 58
(2) Any spalling concrete?				57, 58
(3) Any exposed reinforcement in the concrete?				57, 58
(4) Any erosion?				52

ITEM	YES	NO	REMARKS	*ICC
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4. SPILLWAY (continued)

4. B. Does spillway show: (continued)

(5) Any slope sloughing?				54
(6) Any obstructions?				54
(7) Displacement or offset joints?				59
(8) Loss of joint material?				57, 58
(9) Leakage at the joints?				57, 58
(10) Other?				63

C. Do the energy dissipators show:

(1) Signs of deterioration?				62
(2) Any cracking?				62
(3) Any spalling?				62
(4) Any exposed reinforcement?				62
(5) Are they covered with debris?				62
(6) Other?				64

D. Has release water:

(1) Eroded the embankment?				52
(2) Undercut the outlet?				52
(3) Eroded the downstream channel?				52
(4) Other?				56

E. Emergency Spillway

(1) Is there an emergency spillway?			(If YES, describe)	55

ITEM	YES	NO	REMARKS	*ICC
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5. RESERVOIR CONTROL

A) Recent upstream development?				47
B) Recent downstream development?				42
C) Slides in reservoir area?				44
D) Change in reservoir operation?				49
E) Large impoundment upstream?				49
F) Any debris in the reservoir?				50
G) Other?				50

6. INSTRUMENTATION

A) List type(s) of instrumentation:				27-33
B) In good condition?				27-33
C) Read periodically?				27-33
D) Is data available?				27-33
E) Include all data gathered since last report.				

7. DOWNSTREAM CONDITION

A. Downstream Land Use.

	41
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This dam was inspected by:

Additional comments and recommendations. (Use additional pages)

